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TITLE OF INVENTION

IMPROVED METHOD AND APPARATUS FOR UTILITY WASTE AND VENTING SYSTEMS

by

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CROSS-REFERENCES TO RELATED APPLICATIONS

None.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

None.

REFERENCE TO A MICRO-FICHE APPENDIX

None.

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to plumbing installation in high rise construction projects, and more particularly to an improved method, system, and apparatus for optimally locating collecting and venting stacks for handling plumbing waste.

Description of the Related Art

A preliminary search of the prior art located the following United States patents which are believed to be representative of the present state of the prior art: U.S. Patent No. 5,197,766, issued March 30, 1993, U.S. Patent No. 5,243,716, issued September 14, 1993, U.S. Patent No. 5,037,541, issued August 6, 1991, U.S. Patent No. 3,346,887, issued October 17, 1967, U.S. Patent No. 4,449,741, issued May 22, 1984, U.S. Patent No.

4,919,164, issued April 24, 1990, and U.S. Patent No. 3,894,302, issued July 15, 1975.

Collection and disposal of plumbing waste and the associated venting required to accompany waste collection are well established in the building construction art. Installation methods have typically followed these developments within the uniform building codes for specific venues.

High rise, multistoried dwelling structures are commonly designed with redundant or duplicative plumbing layouts for each floor of the structure. The waste from various plumbing fixtures for each layout are arranged to discharge into common waste stacks and are vented into common vent stacks.

Without regard for contract parameters, installation of high rise plumbing networks is by necessity labor intensive and by design materially wasteful. Typical high rise contract plans over specify the number of plumbing risers to accommodate inefficient fixture placement or orientation. These risers typically flow from floor to floor through individual cans. At the same time, inefficiencies in contract fixture design or placement eliminate the possibility of prefabricating plumbing risers which would readily reduce labor and material costs for plumbing waste and vent riser installation.

Plumbing risers in the art also present physical barriers for associated building trades. For example, the code requirements for post-tension structural cables in particular areas places a premium on floor surface area for laying out these

post-tension cables. Excessive grouping of, or overlarge, plumbing stacks makes meeting the structural code requirements in such high rise projects more costly and time consuming. Similarly, use of individual cans for the plumbing stacks results in larger floor surface area devoted to the plumbing risers or stacks. The presence of excessive plumbing stacks also greatly increases the acoustic and fire-proofing cost requirements in related construction trades, resulting in overall higher project costs.

It is, therefore, an object of the present invention to provide an improved method, system, and apparatus for combining waste and vent stacks into one system with a minimum footprint on the floor surface area.

It is a further objective of the present invention to provide an improved method, system, and apparatus for prefabrication and installation of high rise plumbing waste and vent stacks which would reduce the labor and material costs for installation of the same.

Yet another objective of the present invention is to provide an improved method, system, and apparatus for combining waste and vent stacks which saves contract project bid costs for the plumbing trades.

Another objective of the present invention is to provide an improved method, system, and apparatus for combining waste and vent stacks which reduces costs for acoustic requirements on high rise construction projects.

Another objective of the present invention is to provide an improved method, system, and apparatus for combining waste and vent stacks which reduces costs for structural requirements on high rise construction projects.

Another objective of the present invention is to provide an improved method, system, and apparatus for combining waste and vent stacks which reduces costs for fire proofing requirements on high rise construction projects.

Yet another objective of the present invention is to facilitate installation of auxiliary piping, electrical and other utility hangers within the construction project by elimination of redundant or unnecessary waste and vent stacks.

Further objects and advantages of this invention will become apparent to one skilled in the art according to the description of the invention as follows.

BRIEF SUMMARY OF THE INVENTION

In the present invention, waste and vent stacks for high rise, multi-storied dwelling structure construction are combined into one system which contains each stack in one box instead of individual cans. The plumbing contract drawings and specifications are reviewed to determine which plumbing stacks can be consolidated into groups and unified into one stack. The newly consolidated plumbing stacks are oriented on the contract drawings to pick up all fixtures which have been color coded by type. The newly consolidated plumbing stacks are de-constructed to provide a revised material list. Architectural drawings for

the project are checked to insure no interference with structural requirements. Pre-fabrication drawings by material type are developed and each stack is given a reference number. Special stack requirements are designated for each stack. All stack elements per floor are pre-fabricated with the waste riser consistently on the same side of the stack element box. A pre-fabrication and installation book is prepared and finalized wherein the main distribution piping is coordinated to match up with the pre-fabricated system. Color-code to stack type is established and the job site is pre-labeled accordingly. The pre-fabricated system waste and vent stack boxes are then quickly and readily installed in ascending intervals.

The improved apparatus of the present invention provides a smaller foot-print on the floor surface area, and eliminates many unnecessary waste/vent stacks through consolidation. For example, a typical water closet, lavatory and bath tub fixture group with individual cans for the plumbing riser would require at least forty-four inches in length. The system waste and vent stack box of the present invention requires only twenty-eight inches in length for the same riser.

Other features, advantages, and objects of the present invention will become apparent with reference to the following description and accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

These and other objects, advantages and novel features of the invention will be more readily appreciated from the following

detailed description when read in conjunction with the following drawings, in which:

Fig. 1 is an elevational perspective view of uninstalled pre-fabricated waste-vent stack units according to the present invention in relation to a typical waste-vent stack for several intervals of a standard high rise structure; and

Fig. 2 is an elevational schematic view of the installed pre-fabricated waste and vent stack box system of the present invention for several intervals of a standard high rise structure.

Fig. 3 is an elevational schematic view of a typical waste-vent stack in the art.

Fig. 4 is an elevational schematic view of a typical waste-vent stack according to the present invention.

Fig. 5 is a perspective view of the interval box according to the present invention.

Fig. 6 is a perspective view of the interval cans in the art.

Fig. 7 is an elevational perspective view of a typical waste-vent stack within an interval according to the present invention.

For purposes of this application, a waste stack shall mean the vertical extension of a building drain as a main artery of a drainage system. Waste conveys liquid and fecal matter.

For purposes of this application, a vent stack is the main artery of a vent system which begins below the lowest waste

branch interval, connects to a waste stack, and terminates at the stack vent.

For purposes of this application, combined waste and vent shall mean an entire arrangement of waste and vent system conveying waste and which allows proper airflow through the system.

For purposes of this application, every floor of a high rise, multi-story structure or a vertical distance of 8 to 10 feet (depending on the particular code followed in the respective jurisdiction) is considered an interval.

DETAILED DESCRIPTION OF THE INVENTION

The novel method of the present invention for installing new high rise construction utility waste and vent system plumbing stacks begins with review of the high rise construction plans to locate the contract plumbing risers as designed and specified therein. Once all such risers have been located and so identified, the next step is to determine an optimum placement of alternative plumbing risers within the high rise contract plans and specifications for reduced material and labor considerations, improved acoustical considerations, and improved structural considerations. After the alternative plumbing risers have been placed within the contract plans, contract fixture alignment is adjusted, if necessary, to facilitate optimum placement of alternative plumbing risers.

When all fixtures have been adjusted to accommodate the optimum placement of alternative plumbing risers, contract

plumbing stacks are consolidated into optimal groups and one stack. Following this process, the newly consolidated plumbing system stacks are located in the contract wall plans, and are identified by number and type of materials used. The newly consolidated plumbing system stacks are further grouped by color coding according to types of materials used therein.

Once the newly designed system stacks are thus classified, the newly consolidated plumbing system stacks are drawn up with the waste riser flow lines consistently on the same stack side facing the stack placement in the wall. A material list is generated for each new consolidated plumbing system stack, and proper stack box sizes, corresponding with the newly consolidated plumbing system stacks, are assigned according to the present invention. At this time, the architectural drawings are reviewed to verify proper clearance for the newly consolidated plumbing system stacks, and request for information for walls that may need to be widened to fit the newly consolidated plumbing system stacks is sought.

Pre-fabrication drawings by types of material for each newly consolidated plumbing system stack, typified by example in Figs. 4 and 7, are then developed by:

1) numbering each newly consolidated plumbing system stack;

2) identifying any special stack in the newly consolidated plumbing system stacks;

3) finalizing pre-fabrication drawings;

4) preparing a pre-fabrication book to coordinate main distribution piping to match up with the newly consolidated plumbing system stacks;

5) establishing color coding to stack type within the newly consolidated plumbing system stacks; and

6) pre-labeling the construction job-site.

Once the pre-fabricated drawings are finalized, the separate waste-vent stacks, Figs. 1, 2, and 4, and stack boxes for each interval, Figs. 1, 2 and 5, are fabricated according to the present invention and installed according to the alternative riser plans and specifications.

As shown in Figs. 1 and 2, plumbing risers located in alternative positions than the risers according to the contract plans are depicted by a typical waste riser **10** and a vent riser **20**. Pre-fabricated waste and vent system plumbing stacks **100** are assembled and located within the high rise construction project according to the color-coding and numbering system of the present invention so that the points of connection **80** to the waste and vent risers are according to the method and system of the present invention.

As shown in Figs. 1, 2, and 4, each waste and vent system plumbing stack **100** comprises an upper end, a lower end, a right side facing the stack from inside the building, and a left side facing the stack from inside the building, and a plurality of segments. These waste and vent system plumbing stack **100** segments include a waste riser **12** and a stack vent riser **22** which

are selectively sized and fabricated to readily fit into the system waste riser **10** and vent riser **20** at hub-less points of connection **80**. The stack waste riser **12** and the stack vent riser **22** are pre-fabricated uniformly so that each respective riser is located on the same waste and vent system plumbing stack **100** side relative to the system waste riser **10** and vent riser **20**. The waste and vent system plumbing stack **100** further comprises a plurality of connectors **30** between the stack waste riser **12** and the stack vent riser **22** wherein the connectors are disposed either perpendicular to the stack vent riser and stack waste riser or at forty-five degree angles thereto with the stack vent riser attachments to each connector being higher relative to the stack waste riser attachment for each corresponding connector, Figs. 4 and 7. Conventional stacks in the art do not use these angular connections, Fig. 3, and thus are less compact. Within each waste and vent system plumbing stack **100** are a plurality of branch pipes **40** connected to one or more fixtures which discharge waste water. Each branch pipe **40** is further connected at one end thereof by fittings to the stack through one of the connectors **30** to the stack vent riser **20** and the stack waste riser **10**, as further depicted in Figs. 4 and 7. This unitary, prefabrication construction of waste and vent system plumbing stack **100** units facilitates installation of auxiliary piping, electrical, and other utility hangers within the construction project by elimination of redundant or unnecessary waste and vent stacks.

The pre-fabricated waste and vent system plumbing stack **100**

is contained in a stack box **50** once the stack **100** is installed through each interval, as depicted in Fig. 2. In this manner, the molded stack unit is contained in a box wherein the box length is determined by the number of plumbing fixtures served by the box and the box width is determined by the pipe diameters of the branch pipes **40**, stack waste riser **10**, and stack vent riser **20**, as depicted in Fig. 5. A plurality of stack boxes **50** are correspondingly installed vertically and interconnected to the desired level of high rise construction, wherein each interval of high rise construction vent stack has at least one box.

An example of stack box **50** sizing according to the present invention would be where the connectors **30** to the stack waste riser **10** and stack vent riser **20** are two inch diameter pipes on five inch center-lines. The stack vent riser **20** and stack waste riser **10** are each four inches in diameter on a three inch center-line from each respective edge of the stack box **50**. For these dimensions, the stack box **50** would require a length of twenty-eight inches and a width of six inches. Typical water closet, lavatory and bath tub fixture groups in the art with individual cans for the plumbing riser would require at least forty-four inches in length using a separate can through each interval, as depicted in Fig. 6. The system waste and vent stack box of the present invention requires only twenty-eight inches in length for the same riser, Fig. 5. These dimensions are representative of a typical application of the present invention in high rise construction; however, sizing of the specific stack box **50** is a

direct function of the stack connector and stack riser diameter sizing and placement within the stack box **50**.

The reduced stack box **50** foot-print area on the high rise floor lessens the likelihood that structural requirements, such as post-tension structural cabling, would be effected. Further, acoustic requirements are more easily achieved by the smaller, and fewer in number, pre-fabricated waste and vent system plumbing stacks of the present invention. Costs for fire proofing requirements are minimized by use of the reduced stack box **50** since breaks per interval are reduced.

Material and labor savings are realized by molding branch pipes **40**, connector fittings and connectors **30** are into the pre-fabricated waste and vent system plumbing stack **100** a stack of one unit at the junction of the stack waste riser **10** and stack vent riser **20**, Fig. 7. The pre-fabricated waste and vent system plumbing stack **100** can be constructed of materials suitable for plumbing applications including, but not limited to, cast iron, high density polyethylene, DWV (drainage, waste and vent) copper pipe.